

**DEVICE AND METHOD FOR MOUNTING A SADDLE HUB ON A
PIPE AND CORRESPONDING TAP**

The present invention concerns the mounting of a by-pass saddle on a pipe, particularly a pipe of supplier water or other fluid liquid or gas. First, the invention is relative to a device of assembly of a saddle comprising two side means of fixation.

Often the known saddles are tap saddles of by pass or closing systems for a pipe, provided with two side means of fixation arranged appreciably in contrast one of the another one so as to be able to tighten the saddle on the pipe with an appreciably homogeneous pressure on all the surface of support of the saddle. The joining of the saddle and the means of stress forms a ring.

Traditionally, the means of fixation are constituted of screws and nuts which tight the saddle on the pipe through a rein. For the same internal nominal diameter, the outside diameter varies according to the building material, cast iron, steel, cement, plastic materials, etc. To adapt itself to these variations of outside diameters with this type of fixation, it is necessary to change ring joining the saddle to the rein for fixing the saddle to the pipe. On some models of rings, the length the thread shrank of the screw and the shape of the ring allow by screwing more or less to adapt it to small variations of outside diameters of pipes. So, the known rings are constituted of two half-portions, two screws and two nuts or two tapped holes.

The known saddles present the major inconvenience to require to change of rein and saddle to adapt itself to great variations of outside diameters of pipe corresponding to different nominal diameters. Every nominal diameter of pipe requires generally at least a different ring, even though the rings are if the same type. The multitude of rings presents the inconvenience to constrain to increase stocks to adapt itself to various pipes.

Furthermore, for the great diameters, particularly superiors to 200 mm, the known reins are heavy and cumbersome, that makes difficult the mounting and the fixation of the saddle around the pipe in an opened trench. So the work of fitting of saddles with reins known on great diameters is long and tiring.

SHEET OF REPLACEMENT (RULE 26)

Known rings constituted of two half-parts, two screws and two nuts forming an unity of connection which surrounds a pipe are described by the document DE-U-9408836. This document presents a device of drilling of a pipe, device which contains a radial drilling comprising one junction means. A waterproofness joint is arranged between the unity of connection and the pipe. A muff of protection makes waterproof drilling connection. The extremity of the junction means is stressed in a seal way on the extremity of the muff of protection.

Rings for mounting of a by pass saddle on a pipe staying of small diameters which do not require a hardness stressing are still known by document FR-A-2165360. This document describes a saddle drilled in its centre which is applied with a waterproofness joint against a pipe to leak out. The known saddle contains two means of fixation or of stressing side. The saddle of the device includes hollows which are able to cooperate with a stirrup of stressing carrying about semi-cylindrical bodies of support. Hollows give to the extremities of the stirrup possible movements with rotation. For the fixation, nuts of stressing possessing split pins are fixed to the extremities of the strip of the stirrup by rolling-up of two lateral strips which penetrate in cracks foreseen in the pins of the special nuts.

The document DE-A-2949932 shows a ring for mounting a saddle on a pipe. Said saddle includes side means of fixation of a bracelet 11. This known ring presents a chain constituted of a great number of stiff pieces, special links adapted to the only materials hard that are not marked by an imprint. The chain is fixed by one of the screws crossing a drilling arranged in the respective extremities of the known saddle.

Invention mainly aims to allow in a simple and fast way the connection of a by pass pipe on a full or empty pipe transporting a fluid with an important pressure. This without important stock of parts

For that purpose, the invention has for object a device of mounting of the aforesaid type, in which the means of stressing being an opened bracelet and deformable, the saddle and the bracelet forming a ring; the bracelet includes at least three means of fixation are arranged regularly of an extremity to the another of said bracelet so as to adapt itself to the various outside diameters of pipe by the connecting and the stressing of at least two means of fixation of the bracelet to the means of fixation of the saddle

More specifically, the means of fixation of the bracelet are or include openings being able to let go and lock a part of the means of fixation of the saddle. Openings are arranged bit by bit from an extremity to another of the bracelet. The disposal bit by bit of the openings allows to cut in length the bracelet following the diameter of the pipe.

According to another characteristics and so that the stressing does not require more than a single tool particularly a flat wrench or in spanner, the bracelet is mounted by rotation on the saddle, mounting such as a pulled down locked an extremity of the bracelet around a T part one of the side means of fixation of the saddle, an opening of the bracelet arranging itself at the extremity of the pulling down to allow the passage of the part of connecting of the T of the saddle; the bracelet is provided with a means of reversible fixation such as one screw crossing another opening placed in its second extremity, said screw having to fix the second extremity of the bracelet to the second means of fixation of the saddle.

Pulling downs locked of extremity of the bracelet is arranged on the face of the bracelet intended to be tightened on the pipe so as to pinch at least a pulling down portion between said pipe and the outside edges of the bracelet.

With the aim of obtaining after preparation a ring forming only a single assembling, monoblock, the second extremity of the bracelet according to the invention is pulled down closed around a part of mobile locking of leaky and tapped cylindrical shape forming a sliding and turning nut in the pulling down of the extremity of said bracelet. Screw comes to settle on the one hand in the nut crossed the opening arranged at the end of the pulling down of the bracelet, on the other hand, the head of screw is pulled down in and to squeeze up on two fingers arranged in shape of fork to constitute the second side means of fixation of the saddle. The head of screw is maintained in the axis of fixation by a slice presenting a flat face and the other convex face arranged on the screw, the flat surface in the contact of the head of screw and the convex surface cooperating with a hollow convex imprint arranged in the hollow of the said fork.

[illegible]

So as to obtain waterproofness during the fixation of the connection of loaded pipes, the saddle of by pass of the pipe greatly loads with it present appreciably in sound center a pipe opening of axis radial road with regard to the axis of the pipe. A supple joint realized in a making material which flows as rubber is fixed in a flat and a muff is adjusted in the pipe, a second joint is placed in the continuation of the muff in the contact of the means of fixation of the connection of by pass, average such as a tapping, two joints and muff presenting an internal diameter appreciably upper than the diameter of drilling to form a by pass in the pipe. The use of two joints and muff allows the more or less strong stressing of the connection with regard to the ring following the diameter of the pipe.

Arranged elongated longitudinally opening with regard to length of the bracelet allow the arrangement of said bracelet by rotation of a quarter of tour after penetration of the T.

To resist to the air corrosion and the corrosion of grounds, the saddle being particularly make bronze, characterized in that the bracelet includes mainly a strip made with not oxidable material in particular a metallic band coating with sluggish material such as a composition based of powder of epoxy. The band of the bracelet can also be realized in plastic making material.

This coating rustproof strip resists very well to any chemical corrosion with pipe with ferrous base.

Saddle, ring, screw, slice and nut resist to the air corrosion that they undergo during the stocking before the fitting on the pipe. This ring resist to more one thousand hours in salt fog without any corrosion.

Invention still has for object a method for mounting of a device of connection of an auxiliary pipe of by pass on a load or not supply water pipe, characterized in that said pipe having so well diameter, lower than the distance separating the two side means of fixation of the saddle, greatly equal to the distance separating the two side means of fixation of the saddle that upper than the distance separating the two side means of fixation of the saddle, it includes at least the following successive stages:

- preparation of a ring such as above defined, bracelet being put in length following of the diameter of the pipe,
- presentation and shaping of the ring on the pipe, - stressing of the set in position of functioning,
- screwing and stressing of the device of connection on the saddle,
- waterproof assembly of a device to drill outing of a bit on it upper opening of the hollow of the device of connection,
- drilling of the pipe,
- dismantling of the device to drill,
- lock of the device of connection,
- connecting the system of by pass to the auxiliary pipe.

Invention also has for object a tap of by pass of pipe including a body and one saddle, the body and the saddle being realized in a single set monoblock and / or in one piece and comprising at least two side means of fixation, the means of fixation being radial nerves with regard to the axis of the body of the tap, placing itself greatly in contrast one of the another one and being provided with a device for mounting on the pipe, characterized in that said device is such as describes this above.

A not restrictive example of the invention is now going to be described compared to drawings annexed on which:

- Fig. 1 represents in vertical sectional schematic view a ring, corresponding to the invention, fixed to pipes of three different outside diameters;

- Fig. 2 represent a saddle corresponding to the invention in top plan view, with its ring on the pipe;

- Fig. 3 are a rustproof strip, detail of an opened ring of the shape corresponding to the invention;

- Fig. 4 represent in schematic view a connection by means of a tap of branching of load pipe with a device corresponding to the invention.

- Fig. 5 represent a ring joint according to the invention in Half-sectional view.

The ring 1 fitted on pipe 2a , 2b , 2c of various outside diameters represented to Fig. 1 comprises a saddle 3, a rustproof metal metallic band 4 forming opened ring and deformable. A binding screw 5 fixed to a cylindrical nut 7 bound to the metallic band 4 revolves by the intermediary of a slice 6 in shape of half-sphere. The saddle 3 includes an axial pipe 8 provided with an intermediate muff 9 neighboring to two joints 10 , 11. A tap 12 of taking in charge of the fluid circulating in the pipe 2a , 2b , 2c is screwed on the saddle 3 by means of its thread extremity 13.

The saddle 3 comprises two side means of fixation 14,15, the means 15 of fixation 14 is a T of which cylindrical extremity 16 presents a parallel axis to the axis of the pipe. The other side means of fixation 15 is placed at the opposite of the means of fixation 14. An extremity 17 of the metallic band 4 is pulled down locked around the extremity 16 of the T of the saddle 3, the other extremity of the strip 18 is pulled down locked on the cylindrical nut 7. The screwing of screw her 5 in the nut 7 maintains the ring stressed on the pipe. If pipe 2a is of small diameter, screw 5 tightened is pulled down towards the axis of the pipe 8. The pipe 8 is of axis radial nerve by report has the axis of the pipe, a lower flat 19 of the pipe facilitates the

fitting of the lower joint 10 tablet in the flat 19 between the muff 9 and the surface of the pipe 2a. The lower joint 10 maintains waterproofness between pipe 2a and the muff 9. If the saddle 3 is fixed to a pipe 2 b of average outside diameter, screw 5 revolves on the slice in shape of half-sphere 6 and is more opened than for a fixation of the saddle 3 on a pipe 2a of small diameter. The lower joint 10 marries the surface of the pipe 2b. Although pipe 2b of upper outside diameter has that of the pipe 2a prints less profoundly into the pipe 8, waterproofness between pipe 2b and the muff 9 is maintained by a stronger stressing of the tap on the saddle. This stressing pulls the compression of the muff 9 on the joint 10. Where from waterproofness between the muff 9, the joint 10 and pipe 2b. In case the saddle 3 is fixed to a pipe of great diameter 2c, screw 4 revolves more and the tap is tightened more him also in a way has to urge the muff 9 on the lower joint 10 ' to obtain waterproofness enter the joint 10 and the muff 9.

The saddle 3 is always maintained tightened on the pipe 2c and the lower joint 10 maintains also waterproofness between the pipe 2c and the muff 9. The tap 12 is screwed in the pipe 8 with the threading 20. The tap 12 locks the upper joint 11 on the muff 9 and is locked by one screw 5 freezing 21. The upper joint 11 maintains waterproofness between the tap 12 and the muff 9.

As shown more particularly Fig. 2, the means of fixation 15 of the saddle 3 is constituted of two fingers which constitute a fork. The stem of screw 5 going by the groove 22 formed between the two fingers of the fork 15.

The lateral opening of this groove allows the rotation and the passage of the thread stem of even screw which is already fixed in the cylindrical nut 7. A spherical hollow imprint arranged in the hollow of the fork 15 forms the flat of the slice 6 by allowing it to have a function of kneecap while obtaining an important leading of screw 5. The extremity of the saddle in shape of fork 15 allows a fast mounting without having to remove screw with its cylindrical nut, so avoid the loss of any part of the part ring assembly being monoblock before the moment of the mounting.

Two tapped drillings are arranged radically in the pipe 8 in the top of the saddle 3. These drillings receive one screw of locking 21 that prevents the loosening of the tap 12 with regard to the saddle 3 during the operations of the tap 12.

The strip 4 presents an extremity in another one, the openings 24 arranged bit by bit as represented on Fig. 3. These openings 24 are elongated and arranged longitudinally with regard to the length the strip 4. These forms and capacities of openings 24 allow to thread the extremity 17 of the strip on the T 14 and to fix it by rotation and pulling down. These openings allow also the passage of the stem of screw 5 since the cylindrical nut 7 in the direction of the saddle 3 and of extremity of the stem which overtakes of the cylindrical nut 7.

In variant some openings can not be elongated.

Fig. 4 shows a connection on a full pipe of one tap of by pass with valve of the type with vertical axis of operation 12. The elements of the device of fixation are tracked down by the same digital references that elements corresponding of the device of fixation represented on Fig. 1 - 3. The pipe of entrance 8 is fixed in a way seal on the pipe 2 by stressing of the bracelet 4 on the side means of fixation 14 , 15 of the ring 1. The pipe 8 results in a opened chamber 26 in the upper part of the

body of tap 25. Partially high the opened chamber 26 results in two pipes, a lateral pipe 27 and a vertical pipe 28.

A machine to drill 29 is mounted on the body 25 in the axis of the pipe 28 of the opened chamber 26 and the pipe 8. A shutter 30 is mounted on the tap 12 towards the lateral pipe 27. The shutter is constituted of one screw 31 leaded in a sheath 32 the screw moving a head of closing 33 that can go into the sheath 32 prolonged by an cross-piece 34. The head of closing can also go out of the sheath 30 to fill in a way seal the high part of the opened chamber 26.

Fixation and the connection according to the invention of a tap of connecting a full pipe are made in the following way, a strip 4 drilled bit by bit of elongated openings is cut in the length foreseen to correspond to the outside diameter of the pipe water conveyance. The strip is coated in a making material constituted in base of powder of epoxy, that rounds off the sharp edges of edges. An extremity of the strip 4 is introduced into the T 14 by an elongated opening by leaving of the end of the strip 4. A rotation locks the strip on the T 14. The cylindrical nut 7 is placed in the other extremity of the strip 4. Two extremities are pulled down closed, an elongated opening establishing an opening towards every extremity. Screw 5 comes to lock the nut 7 by way of the second opening by leaving of the end of the strip 4, second opening which forms the opening of extremity with the pulling down of the edge of the extremity 18 of the strip. The saddle 3, the strip 4 forming bracelet and screw 5 form only a single assembly ring the bracelet which is able to revolve with regard to the saddle 3 on the cylindrical part of the T 16.

A single person be enough to place the ring 1 on the pipe 2, to close the bracelet around the pipe, to place and to screw 5 in the groove 22 that tightens and immobilizes the ring on the pipe 2. The tap 12 is screwed on the saddle 3 in the variant where the saddle 3 and the tap 12 are constituted of different parts. The machine to drill 29 and the shutter 30 are mounted on the tap 12. Then pipe 2 is drilled, then the bit of the machine to drill 29 went back up. Suck it of closing 33 is moved and maintains the waterproofness of the high part of the opened chamber 26. The machine to drill 29 is unsettled. A cork comes to close the pipe 28. The head of closing is put off and the lock of the tap 12 allows the unsettling of the shutter, followed from the connecting of the main pipe 2a , 2b , 2c in an auxiliary pipe of by pass.

In variant, the saddle 3 and the body 25 of the tap 12 of by pass pipe in function are realized in a single assembly ring presenting a pipe of entrance capable of being fixed in a way seal on the pipe 2a , 2b , 2c, the said pipe of entrance resulting to a opened chamber containing in its top a pipe of lateral exit 27, the opened chamber 26 presenting a vertical upper pipe 28 fate to be filled receiving in a way seals a machine to drill 29.

According to another variant of realization waterproofness between the ring and pipe 2 is maintained by a one part joint with lips such as represented on Fig. 5. The lower face 35 of the joint is concave with a curve of at least equal to the curve of the pipe 2. The peripheral part 36 presents an line 37 separating it in at least two

faces 38 , 39. The upper face 40 of the joint is confused with a line of curvature giving it a convex aspect. Peripheral and superior faces 38 , 39 , 40 of the joint with lips come to find accommodation in the foreseen imprint under the sole of the saddle 3. The internal part 41 bounding the hollow of the said joint presents an opened re-entrant angle separating at least two faces 42 , 43 of different hillsides. The upper inside 42 having an orientation upward and the lower inside 43 having an orientation downward the pressure of the fluid P1 going in the hollow of the joint with lips decomposes into two constituents, P2 upward in direction to the imprint and another P3 toward the surface of the pipe 2 by way of the outside faces of the joint. The said joint is capable of maintaining waterproofness with pipe 2a , 2b , 2c of various diameters by variation in intensity and place of the pressure and the compression on the pipe 2a , 2b , 2c about is its diameter.

Although invention was described in regard with very particular structures, it is no limited to it and it can be bring to this different variants, as for example combinations of different realizations represented on drawings or above described, without going out of the invention.

Inserted reference signs after technical characteristics mentioned in claims have for only purpose to facilitate the understanding of these last ones and do not there limit at all the reach.